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Attorney's Docket No.: 07977-208001 / US3511

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Shunpei Yamazaki, et al.

Art Unit : 2823

Serial No. : 08/994,038

Examiner : W. David Coleman

Filed : December 18, 1997

Title : CHARGE TRANSFER SEMICONDUCTOR DEVICE AND
MANUFACTURING METHOD THEREOF

MAIL STOP AF

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

REPLY TO ACTION OF SEPTEMBER 30, 2004

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In reply to the Final Office Action of September 30, 2004 (which was supplemental to the Final Office Action of June 22, 2004), Applicant submits the following remarks.

Regarding preliminary matters, Applicant notes that an IDS was filed September 29, 2004. However, an initialed copy of the Form PTO-1449 that was filed with the IDS was not included with the present Office Action. Realizing that the IDS may not have been received prior to the issuance of the September 30 Office Action, Applicant requests that the Examiner return an initialed copy of the listed references with the Examiner's next official communication.

Claims 2, 6, 11, 12, 14, and 16-26 are pending, with claims 2, 16, 19, 24, 25, and 26 being independent. Claims 1, 3-5, and 13 were previously canceled, and claims 7-10 and 15 are withdrawn. Claims 2, 6, 11, 12, 14 and 16-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,873,003 to Inoue et al. (Inoue) in view of U.S. Patent No. 5,582,640 to Okada et al. (Okada).

Applicant respectfully requests that this rejection be withdrawn, since neither Inoue nor Okada, nor any proper combination of the two, discloses or properly suggests all of the elements recited in at least independent claims 2, 16, 19, 24, 25, and 26, and, accordingly, the Office Action fails to establish a prima facie case of obviousness under 35 U.S.C. 103(a). Specifically, in the Response of April 6, 2004, Applicant set forth at least the following arguments in support of the above contention that a prima facie case of obviousness has not been established:

1. Neither Inoue nor Okada, nor any proper combination of the two, discloses the limitation of independent claim 2 that, "at least one of the vertical and horizontal charge coupled devices (CCD) comprises a crystalline semiconductor film having a plurality of crystals extending in a crystal growth direction;" and

2. Neither Inoue nor Okada, nor any proper combination of the two, discloses the limitation of independent claim 2 that, "at least one of the vertical and horizontal charge coupled devices that has the crystalline semiconductor film is arranged such that a charge transfer direction of the at least one of the vertical and horizontal charge coupled devices is coincident with the crystal growth direction."

The Office Actions of June 22 and September 30, 2004, however, do not appear to address either of these two arguments.

For example, regarding the first enumerated argument, the Office Action of September 30 states that Inoue discloses that, "at least one of the vertical and horizontal charge coupled devices comprises a crystalline semiconductor film having a plurality of crystals extending in a crystal growth direction." However, as pointed out in Applicant's response of April 6, 2004, the Office Action merely makes a general allegation that Inoue discloses this claim feature, and does not provide any specific showing as to where or how Inoue does so.

The Office Action of June 22 states in paragraph 4 that "Applicants contend that Inoue ... fails to disclose at least one of the vertical and horizontal charge coupled devices." In fact, as just referenced, the response of April 6 contained no such assertion.

Rather, the April 6 response pointed out that Inoue contains no teaching or suggestion that a (vertical or horizontal) CCD "comprises a crystalline semiconductor film having a plurality of crystals extending in a crystal growth direction," and it was this assertion to which the present Office Actions contain no response.

In particular, the Office Action of September 30 appears to identify film 1753 of Inoue as disclosing the claimed "crystalline semiconductor film" (see, e.g., paragraph 2 of the September 30 Office Action). However, the Office Action does not identify any teaching of Inoue that

discloses that the film 1753 of that reference includes a plurality of crystals in a defined crystal growth direction, as recited in independent claim 2.

Applicant notes that the defined "crystal growth direction" is referenced in the very next limitation of claim 2, i.e., "wherein a crystal structure of the crystalline semiconductor film in the crystal growth direction is continuous..." Therefore, since no "the crystal growth direction" of the film 1753 has been defined in Inoue, Applicant submits that it may not fairly be said that a crystal structure of the crystalline semiconductor film in (that) crystal growth direction is continuous. Nonetheless, the Office Action states that Inoue discloses this claim element (see, e.g., paragraph 2 of the September 30 Office Action), again without any identification of any portion of Inoue that provides such a disclosure.

Regarding the second enumerated argument, above, it follows from the above discussion that neither Inoue nor Okada, nor any proper combination of the two, discloses or suggests that, "at least one of the vertical and horizontal charge coupled devices that has the crystalline semiconductor film is arranged such that a charge transfer direction of the at least one of the vertical and horizontal charge coupled devices is coincident with the crystal growth direction."

That is, the Office Action relies on Inoue for disclosing the recited "crystal growth direction" of the film 1753. Since, however, Inoue provides no such teaching regarding the claimed "crystal growth direction," Applicant submits that, even if Okada were held to disclose all of the remaining features of the just-recited claim element, there would still be no disclosure or suggestion that "...a charge transfer direction of the at least one of the vertical and horizontal charge coupled devices is coincident with the crystal growth direction."

Further, as also pointed out in Applicant's June 22 response, Okada does not contain any relevant teaching that is pertinent to the "charge-coupled devices" recited in claim 2. In particular, even assuming that Okada illustrates a (horizontal) crystal growth direction of a silicon grain and/or provides teachings concerning electron mobility with respect to a grain boundary, Applicant respectfully submits that the Office Action makes no mention as to how either Inoue or Okada is thought to relate this crystal growth to (the arrangement of) the charge

coupled device(s) recited in claim 2, such that the charge transfer direction of the charge coupled device(s) is coincident with the crystal growth direction.

In this regard, and as pointed out in the response of April 6, Applicant submits that Okada contains only a limited mention of any CCD device, and then only as a light receiver for spectrochemical analysis, a function that is unrelated to the relevant limitation of claim 2. Applicant recognizes that Okada may not be viewed or attacked as a single reference in the context of a combination of references under 35 U.S.C. 103(a); however, in the present case, Applicant submits that Okada does not provide the teaching(s) alleged in the Office Action. That is, as referenced above, the Office Action maintains that Okada provides a teaching of a charge transfer direction of a charge coupled device (specifically, the Office Action states in lines 4-6 of page 3 that "Okada teaches ...a charge transfer direction of the ... charge coupled device(s)..."), when, in fact, Okada provides no such teaching.

As a result, and further to the points above, the Office Action fails to explain why an artisan of ordinary skill practicing Inoue (which relates to charge coupled devices) at the time of the invention would have been motivated to look to Okada (which does not relate to charge coupled devices in any manner relevant to the subject matter of claim 2) to modify Inoue and obtain the subject matter of claim 2.

Accordingly, Applicant respectfully submits that neither Inoue nor Okada, nor any combination of the two, discloses or properly suggests at least the claim limitations recited in the two enumerated points, above.

Therefore, for at least the above reasons, Applicant respectfully submits that claim 2 is in condition for allowance. Independent claims 16, 19, 24, 25, and 26, which recite the same or similar features as those discussed above (except that, for example, claims 16, 19, 25, and 26 refer specifically to a charge transfer direction of MOS capacitors relative to a defined crystal growth direction, within a charge coupled device (CCD)) are therefore also believed to be in condition for allowance for at least the same reasons. Accordingly, dependent claims 6, 11, 12, 14, 17, 18, and 20-23 are believed to be in condition for allowance for at least the same reasons.

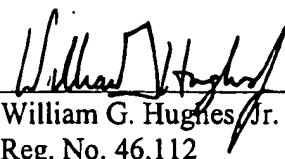
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Please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

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